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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,407	12/15/2000	Benedict G. Pace	NH-07a	8815

7590 08/28/2003

John F McCormack
116 Milburn Lane
Roslyn Heights, NY 11577

EXAMINER

GUERRERO, MARIA F

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 08/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/737,407

Applicant(s)

PACE, BENEDICT G.

Examiner

Maria Guerrero

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 2822

DETAILED ACTION

1. This Office Action is in response to the Election and the Amendment filed July 28, 2003.

Claims 1-24 are pending.

Election/Restrictions

2. Applicant's election of Species II in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 1-15 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 5.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 16 and 19-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Wood et al. (U.S. 3,663,184).

Wood et al. teaches providing an insulating substrate having metallic pads, depositing a metal over the metallic pads (Fig. 1a-1d, col. 3, lines 14-60). Wood et al. discloses the bumps comprising a metal having a melting point over 350°C and below the melting point of the metal forming the metallic pads (inherent) (col. 2, lines 10-15). Wood et al. teaches melting a metal on the metallic pads to form metal bumps (col. 2, lines 12-15). Furthermore, Wood et al. discloses the metallic pads having refractory metals and the bumps having gold (Fig. 2d, col. 2, lines 20-27, col. 3, lines 5-10). Wood et al. teaches the use of copper as conventional in the art (col. 3, lines 67-70).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (U.S. 3,663,184) in view of Yamaji et al. (U.S. 6,159,837).

Regarding claims 17-18, Wood et al. does not specifically show the metal being in a powdered form and being deposited by screen-printing. However, Yamaji et al. teaches depositing the metal by screen-printing in a powdered form (col. 4, lines 20-25, col. 6, lines 3-12).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to include the conventional step of depositing the metal by screen-printing in a powdered form in Wood et al. reference as taught Yamaji et al. The modification would provide a highly reliable semiconductor device with reduce thermal stress (Yamaji et al., Abstract).

6. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood et al. (U.S. 3,663,184) in view of Kondo et al. (U.S. 5,656,858).

Regarding claims 23-24, Wood et al. does not specifically show coating the bumps with a barrier metal and the using a solder aid to enhance solderability. However, Kondo et al. teaches the bump being cover with a wiring pattern and being

Art Unit: 2822

solder in order to be electrically connected to an external substrate (Fig. 1, col. 3, lines 40-45).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Wood et al. reference by including Kondo et al. teaching. The modification is proper because Wood et al. suggested the step of bonding to support substrates (col. 2, lines 54-58).

Conclusion


7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. CRC Handbook of Chemistry and Physics is cited as evidence to show that the metal forming the bumps on Wood et al. have a lower melting point than the metallic pads. Belenger, Jr. (U.S. 5,969,418) teaches a method of attaching a chip to a substrate. Hasegawa (U.S. 4,742,023) teaches the use of gold as the bump film material as well known in the art.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 703-305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Art Unit: 2822

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


Maria Guerrero
Patent examiner
August 22, 2003